



Identification of ectoparasites of ornamental birds in the north of Sistan and Baluchestan (southeast Iran)

Vahideh Mahdavi Fard,^a Fariborz Shariati Sharifi,^a Maryam Ganjali,^a Mohammad Jahantigh,^b
Julio Lopez-Aban^c

^a Department of Pathobiology, Faculty of Veterinary Medicine, University of Zabol, Zabol, Iran.

^b Department of Clinical Science, Faculty of Veterinary Medicine, University of Zabol, Zabol, Iran.

^c Department of Parasitology, Faculty of Pharmacy, University of Salamanca, Spain.

ABSTRACT

Several species of ectoparasites infect birds. These parasites that are considered arthropods include: mites, ticks, lice, bugs, fleas, mosquitoes, and flies. This study aimed to identify the ectoparasites species on ornamental birds and determine their prevalence in Zabol and Zahedan in the northern part of Sistan and Baluchestan. A total of 318 birds were examined and inspected for ectoparasites. Parasites were collected by forceps and stored in 70% ethanol. In parallel to the identification of their species, the samples were cleared in 10% KOH following which light microscopy was used to identify the parasites according to their morphological characteristics and the descriptive keys proposed for each species. The overall prevalence of ectoparasites in birds was 21.7%. The ectoparasites were identified as *Menopon gallinae*, *Menacanthus stramineus*, *Columbicola columbae*, *Goniodes pavonis*, *Myrsidea fasciata*, an unknown species from *philopetrus* genus *Argas reflexus*, *Pseudolinchya*, and *Culicoides*. So far few studies have been performed on parasites in birds in Sistan and Baluchestan. Identification of parasites (such as lice in birds) in any region of the country helps us to improve our knowledge about parasitic fauna in this area.

Keywords

ectoparasites, ornamental birds, Sistan and Baluchestan

Number of Figures: 2
Number of Tables: 0
Number of References: 5
Pages: 68-72

Abbreviations

CI: confidence interval

M. fasciata: *Myrsidea fasciata*

C. heterograffus: *Cuclotogaster heterograffus*

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The birds housed and bred for an exclusively ornamental use are called pet birds. This category includes mainly Passeriformes like canaries, finches, mynah, and sparrows. They are also called songbirds and Psittaciformes includes parrots, parakeets, budgerigars (*Melopsittacus undulatus*), and love birds (*Agapornis roseicollis*), quail (*Coturnix coturnix*), pheasant (*Phasianus colchicus*), Partridge, peacock, and guinea fowl [1]. Because this avian group is in a close relationship with humans, it is of great importance to pay attention to their health and hygiene. Ectoparasites that infect birds are considered mites, ticks, lice, bugs, fleas, mosquitos, and flies. One of which that causes damage in birds is lice. Lice are divided into two types of chewing (*Ischnocera*, *Amblycera*) and sucking parasite which are permanent obligate ectoparasites. Chewing lice are mostly parasitic on bird species and feed on feathers and skin scales. Sucking lice can cause skin irritation, and suck blood. Lice can have very harmful effects that lead to anemia and low production in the birds [2]. The first study conducted on the identification of avian lice from domestic birds in Iran was by Rafyi et al. in 1968 [3]. Eslami et al. performed research in 2009 on native birds from Golestan Province in which six lice species were reported, including *Menopon gallinae*, *Menacanthus stramineus*, *Lipeurus caponis*, *Goniodes dissimilis*, *Coclotogaster heterograffus* and *Dermanyssus gallinae* that is a type of mite [4]. In another study, 106 birds were examined for lice infestation in the east of Iran which 52 (49.05%) were infested and 11 lice species were identified [1]. Dik and Halajian have examined 79 wild birds in northern Iran and have demonstrated 15.2% of them infested with 11 lice species [5]. In another study that was conducted in 2013 by Azizi et al. on 26 eagles taken to Shahr-e-Kurd's veterinarian clinic, *Laemobothrion maximum* louse was identified [6]. Despite the existence of a rich fauna of birds in Sistan and Baluchestan, few works have been done for the identification of avian ectoparasites. This study aimed to determine the prevalence of ornamental bird infestation with ectoparasites in the northern side of Sistan and Baluchestan province and to identify the parasites' species to increase the knowledge of parasites fauna in the region.

This study was performed in Zabol and Zahedan (cities in the north of Sistan and Baluchestan province in the southeast of Iran) from March to December 2016. A total of 318 birds belonging to four orders of Psittacines, Columbiformes, Passeriformes, and poultry were examined for ectoparasites. Some of them were randomly selected from the zoo and some from the bird shops in Zabol and Zahedan. The feathers of

a different part of the body including head, neck, under the wings, legs, and anus were raised and thoroughly examined for ectoparasites. The attached ectoparasites such as louse, fly, mosquitos, and ticks were removed and transferred in labeled tubes to the parasitology lab of the Faculty of Veterinary Medicine, University of Zabol. The lice were cleared for one day in 10% KOH and another day they were stored in distilled water. After 24 hours, dehydration was carried out in graded series of ethanol (70%, 80%, and 90% and 99%) each for 24 hours, respectively, and then the specimens were mounted [7]. The collected specimens were identified using diagnostic keys [8, 9, 10, 11, 12, and 13]. To confirm the diagnosis, some specimens were sent to the Department of Parasitology, University of Salamanca, Spain. The Pearson chi-square test was used for statistical analyses. The population prevalence of ectoparasites with a 95% CI was calculated using a binomial distribution.

Out of 318 birds, 69 (21.70%) (95% CI: 17.3% - 26.6%) of them were infested with ectoparasites. The prevalence of ectoparasites in Psittacines, Passeriformes, Columbiforms, and poultry were 18.6%, 18.2%, 34.4%, and 9.8%, respectively. The difference in the prevalence of ectoparasites between the four groups of birds was statistically significant ($p = 0.003$).

The isolated ectoparasites were identified as follows: *M. gallinae*, *M. stramineus*, *M. fasciata*, *C. columbae*, an unknown species from *Philopterus* and *G. pavonis* genera. The soft tick found in this study was *A. reflexus*, which is mostly found in bloodsucking state on hosts.

Infestation with *Pseudolynchia* and their larvae was seen in adult pigeons and their chicks and a species of *Culicoides* mosquito was identified in an investigation of a cage resided by several rose-ringed parakeets.

According to Figure 1a, the highest infestation rate (40%) in the Psittacine group belongs to cockatiel and the lowest prevalence rate was scored for budgerigar in which no infestation was diagnosed. In Passeriforms, finch and canary were found with no infestation and a high rate of prevalence (44%) was related to myna (Figure 1b). In Columbiforms, collared dove (*Streptopelia*) showed no infestation (Figure 1c) and the highest rate of prevalence was documented for peacock as a member of the poultry group (Figure 1d).

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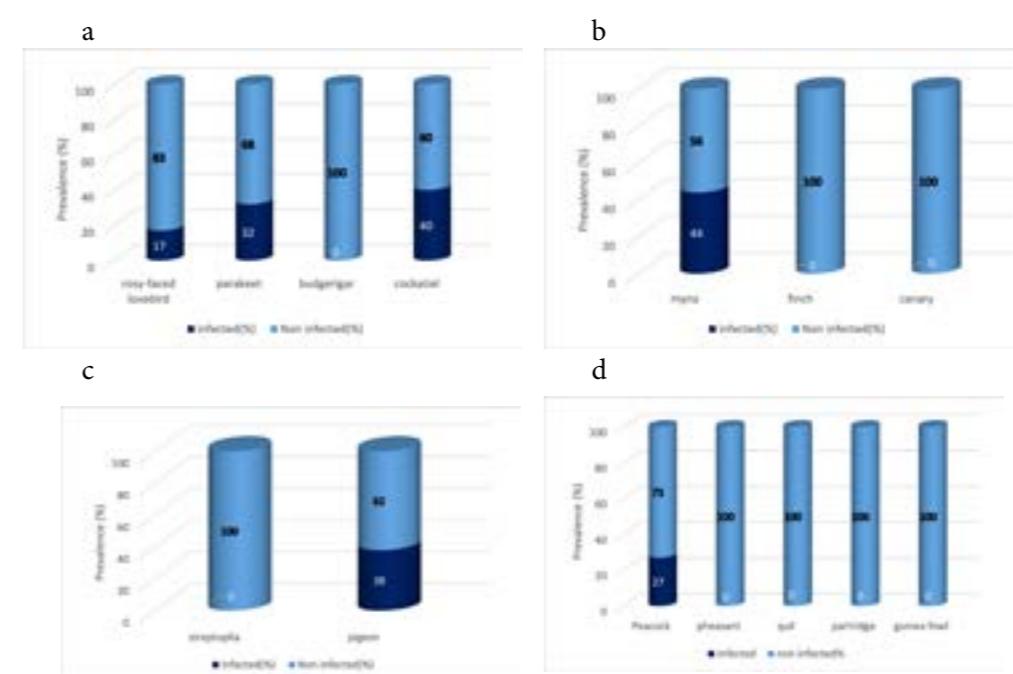


Figure 1.

a) The prevalence of lice infestation (%) in Psittacines. b) The prevalence of lice infestation (%) in Passeriformes. c) The prevalence of lice infestation (%) in Columbiforms. d) The prevalence of lice infestation (%) in poultry.

The results showed the highest prevalence of ectoparasites in myna with 44%, while other birds in this study include budgerigar, rosy-faced lovebird, finch, canary; Eurasian collared dove, pheasant, quail, partridge and guinea fowl were found with no infestation with ectoparasites.

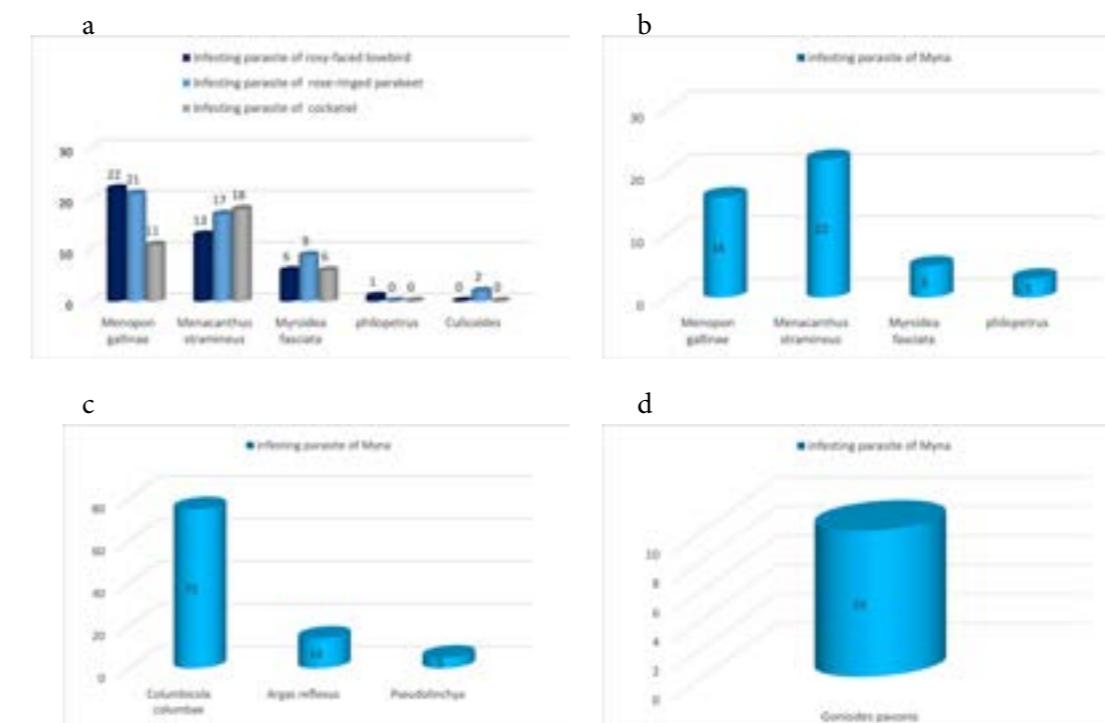


Figure 2.

a) The species and number of infesting parasites of each of Psittacine bird. b) The species and number of infesting Passeriformes. c) The species and number of infesting parasite of each of Columbiform bird. d) The species and number of infesting parasite of each of poultry.

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The investigation of the ectoparasites in birds is of great importance because they can lead to feather reduction, injury and skin damages, and nervous stress and reduction of production. Furthermore, they can be also considered as a vector of pathogens. On the other hand, the people that are in contact with infected birds are exposed to infection, and although the infection is usually for a short time it can cause discomfort. The studies have shown that fleas and lice cause the birds' body growth and egg production to be reduced from 2% to 25% and even more [2]. In Iran, bird's ectoparasites fauna is almost unknown, but recently few studies have been carried out to identify that, especially the recognition of the lice in birds. By identifying several ectoparasites infestations in ornamental birds in the southeast of the country, the present study took a step towards perfecting the fauna of ectoparasites in Iran.

It was assumed that the ornamental birds from Sistan and Baluchestan have been infested with special species of ectoparasites due to the adjacency of the region to the country's eastern borders and illegal and uncontrolled entry of the birds to the region. According to the results, myna has shown infestation with a new species of *Philopterus spp.* featuring morphological properties from the previously recognized features. This is the first time that *Myrsidea fasciata* and *Philopetrus* have been reported in this region. In the meanwhile, infestation with *M. fasciata* lice has been reported for the first time in Iran's ornamental birds.

In a study that was carried out by Hashemzadeh et al. in 2008 on 50 domestic fowls in Tabriz, 44 cases (88%) of the poultry were infected with ectoparasites. In their study, louse species as *C. heterograffus* in 86%, *M. gallinae* in 80%, *G. dissimilis* in 62%, and *L. caponis* was found in 26% of the cases. *K. mutans* was found responsible for 8% of the infections and *A. persicus* tick accounted for 18% [14]. In another study that was conducted by Eslami et al. in 2009 on native birds from the Golestan province, infection with lice species such as *M. gallinae*, *Me. stramineus*, *L. caponis*, *G. dissimilis*, *C. heterograffus*, and *D. gallinae* were 40%, 40%, 32%, 38%, 8%, and 20%, respectively [4]. Nazarbeigy et al. in an investigation of parasitic infestation in 60 domestic fowls native to the city of Ilam have reported that 56 of the studied fowls (93.3%) were infested with ectoparasites. These parasites were *M. gallinae* (55%), an unknown goniodes (18.3%), *L. caponis* (53.3%), *Me. stramineus* (58.3%), *G. gallinae* (81.6%), *K. mutans* (23.3%) and an anonymous gonalobia (33.3%) [15].

In 2013, Moodi et al. performed a study on 106 passerine birds. In this study, 52 (49.05%) out of 106 birds were infested with louse. In overall, 456 lice belonging to 11 species were identified, all of which had

been reported for the first time in Iran [1].

Authors' Contributions

VMF: Performed the experiments. FSS: Designed the experiments, supervised the dissertation, identified the parasites, analysed the data, and wrote the manuscript. MG: supervised the dissertation, identified the parasites, and wrote the manuscript. MJ: supervised the dissertation. JL-A: Identified the parasites.

Acknowledgments

The authors gratefully acknowledge financial support from the University of Zabol, Iran. This paper is part of a DVM dissertation from the University of Zabol.

Conflict of Interests

The authors declare that there is no conflict of interest.

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**How to cite this article**

Mahdavi Fard V, Shariati Sharifi F, Ganjali M, Jahantigh M (2021). Identification of ectoparasites of ornamental birds in the north of Sistan and Baluchestan (southeast Iran). Iran J Vet Sci Technol. 12(2):8-72.
DOI: <https://doi.org/10.22067/veterinary.v12i2.87675>
URL: https://ijvst.um.ac.ir/article_31151.html